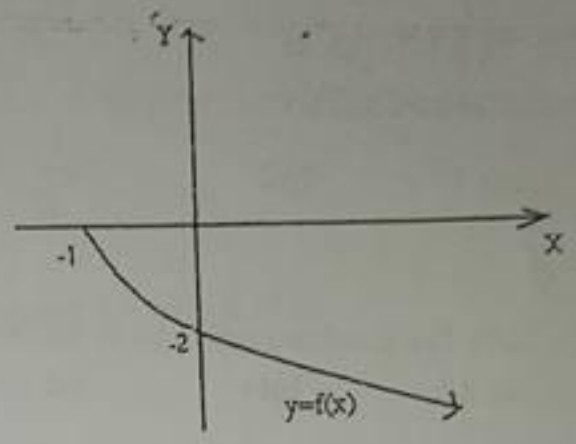
Birzeit University
Department of Mathematics
math 141.

Final Exam — Fall 2008
Name : ..... Number:.....
Instructor of discussion :..... Section :.....

Question # 1 (66%): Circle the correct answer :

1) The graph on the right represents the graph of the function



a) $f(x)= 1-\sqrt{x-1}$ b) $f(x)= 1-\sqrt{x-1}$
c) $f(x)= 1-\sqrt{x+1}$ d) $f(x)= -2\sqrt{x+1}$

2) $\lim_{x\to 1^+} \frac{-2x+5}{x^2-1} =$

a) ∞ b) $-\infty$ c) 0 d) $-\frac{2}{5}$

3. $\int \frac{dx}{\sqrt{x}(1+\sqrt{x})^2}$

a) $\frac{-2}{1+\sqrt{x}}+c$ b) $\frac{1}{1+\sqrt{x}}+c$

c) $\frac{1}{\sqrt{x}(1+\sqrt{x})}+c$ d) $\frac{-1}{1+\sqrt{x}}+c$

4. The solution of the inequality $x+1 \le \frac{2}{x}$ is

a) $(-\infty,0]$ b) $(-\infty,-2]\cup(0,1]$ c) $(-\infty,0)\cup(\frac{1}{2},\infty)$ d) $(-\infty,0)\cup(0,\frac{2}{3}]$

5. The domain of the function $f(x)=\frac{1}{\sqrt{9-x}}$ is :

a) $(-3,\infty)$ .b) $(-\infty,9)$ c) $(-\infty,3)$ d) $(-\infty,9)\cup(9,\infty)$

6.The range of the function $f(x)=\frac{1}{\sqrt{9-x}}$ is :

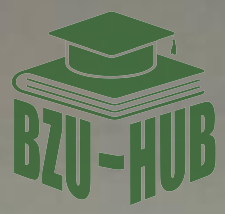
a) $(0,\frac{1}{3}]$ b) $(-\infty,0)$ c) $[\frac{1}{3},\infty)$ d)$(0,\infty)$

7) If $f(x)=\sin 2x$ then $\lim_{h\to 0}\frac{f(\pi+h)-f(\pi)}{h} =$

a)2 b)4 c)-1 d)-2

8) $\lim_{x\to 2}\frac{x-2}{\sqrt{2x+5}-3}=$

a) 1 b)2 c)3 d)4



9) $\int_{-1}^{1}(1-|x|)dx=$

a) 1 b)2 c)$\frac{1}{2}$ d)$\frac{3}{2}$

10) The absolute maximum of the function $f(x)=x^3+2x+2$ on the closed interval [-2,2] is

a) 12 b)14 c)5 d)8

11)The equation of the tangent line to the curve $y=\theta+\cos\theta$, $x=\theta\sin\theta$ when $\theta=\frac{\pi}{2}$ is

a) $y=-x+2$ b) $y=x-1$

c) $y=1$ d) $y=\frac{\pi}{2}$

12) If $\int_{3}^{1}f(x)dx=5$, and $\int_{1}^{2}f(x)dx=7$, then $\int_{2}^{3}f(x)dx=$

a) −12 b)2 c) −2 d)12

13) $\int_{0}^{1}\sqrt{1-x^2}dx=$

a) $\frac{\pi}{4}$ b)$\frac{\pi}{2}$ c)$\frac{\pi}{6}$ d)π

14)If $h(x)=\frac{2f(x)}{x+2\cos x}$, $g(x)=\sqrt{x-1}$ and $f(0)=2$ $f'(0)=-1$ then $(g\circ h)'(0)=$

a)0 b)1 c)-2 d) -1

15)If $f(x)=\sin^2(x)-2x$ then f(x) has

a) At least two real roots b)At least one real roots

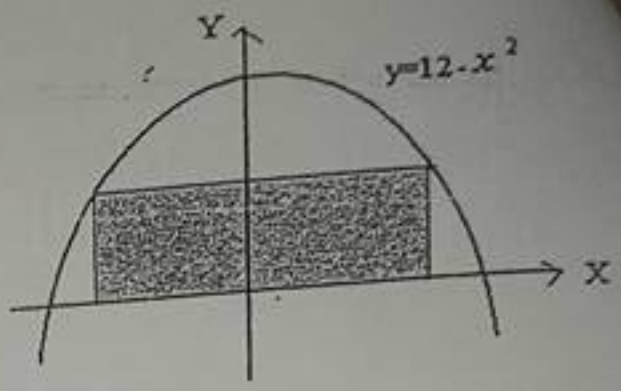
c)Exactly one real root d)Exactly two real roots

16) If P is a partition for the interval $[0,\pi]$ into n equal subintervals , then $\lim_{n\to\infty}\sum_{k=1}^{k=n}\frac{\pi}{n}(\cos\frac{k\pi}{n}) =$

a)0 b)1 c)-1 d)Does not exist

17)The largest area of a rctangle whith base on the X- axis and its upper two vertices on the parabola $y=12-x^2$ is

a)24 b)32 c) 16 d)48



18)Let $f(x)=x^2$ defined on [a,b] , then the value of c that satisfies the mean value theorem is

a)a+b b) $\frac{a-b}{2}$ c) $\frac{a+b}{2}$ d) $\sqrt{ab}$

19)If $g(x)=\int_x^{x^3}\frac{dt}{t}$ where x>0 , then $g(x)' =$

a) $\frac{2}{x}$ b) $\frac{1}{x}$ c) $\frac{1}{x^3}-\frac{1}{x}$ d) $\frac{3}{x^3}-\frac{1}{x}$

20)The average value of the function $f(x)=2x\sqrt{x^2+1}$ on $[0,\sqrt{3}]$ is

a) $\frac{2}{\sqrt{3}}$ b) $\frac{7}{3\sqrt{3}}$ c) $\frac{14}{3\sqrt{3}}$ d) $\frac{8}{\sqrt{3}}$

21) If $f'(x)=x^2-x^4$ then f(x) has

a) Local maximum at x=-1 and local minimum at x=1

b) Local maximum at x=1 and local minimum at x=-1

c) Local maximum at x=0 and local minimum at x=1

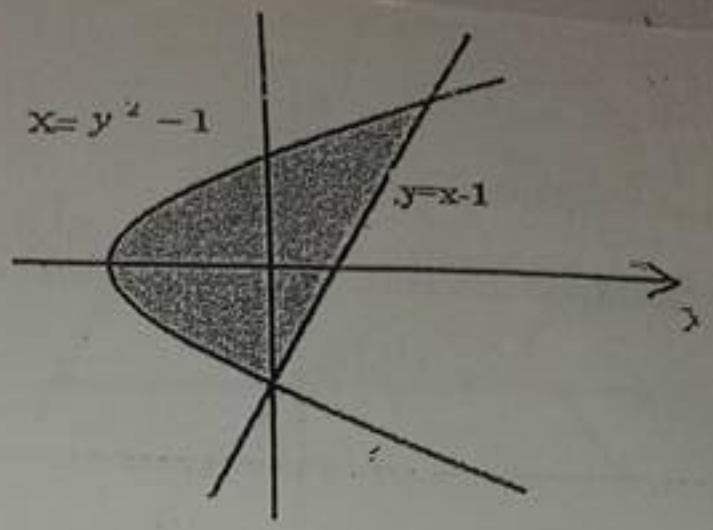
d) Local maximum at x=1 and local minimum at x=0

21)If the volume of a sphere is changing at the rate 4π ft^3 / sec when the radius r=2 ft then the rate of change of the radius is

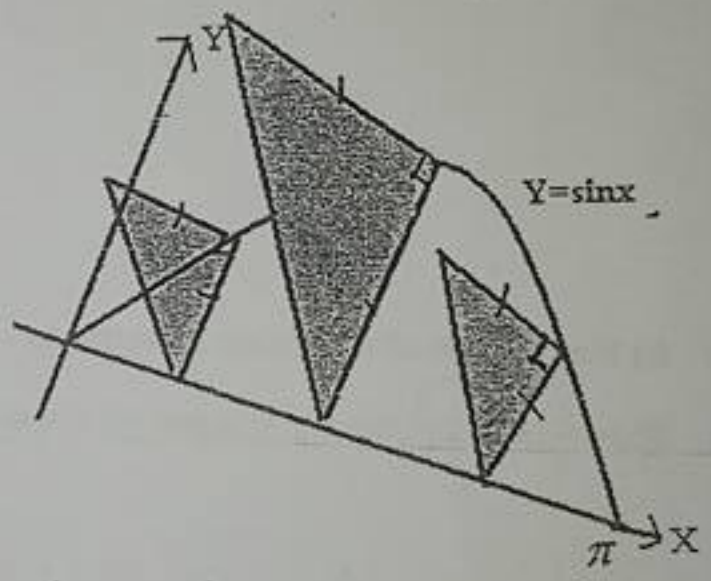
a) $\frac{1}{2}$ ft/sec b) $\frac{1}{4}$ ft/sec c) $\frac{3}{2}$ ft/sec d) $\frac{5}{2}$ ft/sec

Question #2(10%)

a) Find the area of the shaded region



*b)*The base of a solid is the region between the curve $y= 2\sqrt{\sin x}$ and the X- axis on the interval $[0\ \pi]$. The cross sections perpendicular to the X-axis are isosceles right triangles with one leg running from the X-axis to the curve. find the volume of the solid



Question#3 (12%)

a) find the length of the curve $f(x)=\frac{1}{3}(x^2+2)^{\frac{3}{2}}, 0 \le x \le 2$

b) Find the area of the surface generated by revolving the curve $f(x)=\frac{1}{3}(x^2+2)^{\frac{3}{2}}, 0 \le x \le 2$, in part (a) a bove around the Y- axis